

WHAT IS CLAIMED IS:

1. A quick fill cap for a toy gun capable of discharging an output stream  
2 of liquid, the toy gun having a liquid reservoir for storing a quantity of liquid and a fill  
port for depositing liquid in to the liquid reservoir, the quick fill cap comprising:

4 a cap portion having a throughbore, the cap portion demountably engaging the  
fill port of the toy gun when the cap portion is disposed thereon, and forming a  
6 substantially air-tight and water-tight seal with the fill port;

a one-way valve connected to the cap portion proximate an opening of the  
8 throughbore, wherein the one-way valve is disposed on the interior of the liquid  
reservoir when the cap portion is demountably attached to the fill port, the one-way  
10 valve allowing liquid to flow from the exterior of the liquid reservoir through the  
channel formed by the throughbore of the cap portion and into the reservoir, and  
12 preventing liquid from flowing from the interior of the liquid reservoir through the  
channel formed by the throughbore of the cap portion to the exterior of the reservoir;  
14 and

a support member disposed within the one-way valve when the one-way valve  
16 is connected to the cap portion, the support member preventing the one-way valve  
from collapsing and entering the throughbore of the cap portion, and allowing liquid  
18 to flow between the throughbore and the one-way valve.

2. A quick fill cap as defined in claim 1, wherein the one-way valve  
2 comprises a duck bill valve.

3. A quick fill cap as defined in claim 2, wherein the cap portion  
2 comprises a stem extending downwardly and defining a portion of the throughbore of  
the cap portion, wherein a portion of the duck bill valve is disposed on the outer  
4 surface of at least a portion of the stem with the inner surface of the portion of the  
duck bill valve engaging the outer surface of the at least a portion of the stem, the  
6 inner surface of the portion of the duck bill valve and the outer surface of the at least a

portion of the stem being adapted to form a substantially air-tight and water-tight seal  
8 therebetween, wherein the support member engages the stem to prevent the duck bill  
valve from collapsing and entering the stem.

4. A quick fill cap as defined in claim 3, wherein stem and the support  
2 member are integrally formed as a single unitary component.

5. A quick fill cap as defined in claim 1, wherein fill port has a threaded  
2 outer surface and a first groove in a portion of the threaded outer surface, the cap  
portion comprising a threaded inner surface engaging the threaded outer surface of the  
4 fill port and forming a substantially air-tight and water-tight seal between the quick  
fill cap and the fill port, the cap portion having a second groove in a portion of the  
6 threaded inner surface and corresponding to the first groove, wherein the first and  
second grooves define a channel adapted to place the liquid reservoir in fluid  
8 communication with the atmosphere external to the liquid reservoir when the first and  
second grooves are aligned as the cap portion is turned about the fill port.

6. A quick fill cap as defined in claim 1, comprising a hollow funnel  
2 having a lower surface connected to an upper surface of the cap portion such that a  
substantially air-tight and water-tight seal is formed between the lower surface of the  
4 hollow funnel and the upper surface of the cap portion, the hollow funnel being  
substantially aligned with the throughbore of the cap, and wherein the hollow funnel  
6 is disposed external to the liquid reservoir when the cap portion is demountably  
attached to the fill port.

7. A quick fill cap for a toy gun capable of discharging an output stream  
2 of liquid, the toy gun having a liquid reservoir for storing a quantity of liquid and a fill  
port for depositing liquid in to the liquid reservoir, the quick fill cap comprising:

4 a cap portion having a throughbore, the cap portion demountably attaching to  
the fill port of the toy gun when the cap portion is disposed thereon, and forming a  
6 substantially air-tight and water-tight seal with the fill port; and

an umbrella valve connected to the cap portion and having a valve body  
8 disposed proximate an opening of the throughbore such that the one-way valve is  
disposed on the interior of the liquid reservoir when the cap portion is demountably  
10 attached to the fill port, the valve body of the umbrella valve engaging the cap portion  
to prevent liquid from flowing from the interior of the liquid reservoir through the  
12 channel formed by the throughbore of the cap portion to the exterior of the reservoir,  
and the valve body disengaging to allow liquid to flow from the exterior of the liquid  
14 reservoir through the channel formed by the throughbore of the cap portion and into  
the reservoir.

8. A quick fill cap as defined in claim 7, wherein the cap portion  
2 comprises a stem extending downwardly and defining a portion of the throughbore of  
the cap portion, and a ring having an aperture therethrough with an aperture diameter,  
4 the ring being disposed within the throughbore of the cap portion, and the umbrella  
valve comprises a shaft extending outwardly from the valve body, and a knob having  
6 a knob diameter disposed at the opposite end of the shaft from the valve body,  
wherein the knob diameter is greater than the aperture diameter, and the knob is  
8 inserted through the aperture with the ring engaging the knob to connect the umbrella  
valve to the cap portion.

9. A quick fill cap as defined in claim 8, wherein the cap portion  
2 comprises at least one rib connecting the ring to an inner surface of the throughbore of  
the cap portion, wherein the at least one rib, ring and inner surface of the throughbore  
4 define at least one opening adapted to allow liquid to flow through the throughbore of  
the cap portion and into the reservoir.

10. A quick fill cap as defined in claim 9, wherein fill port has a threaded  
2 outer surface and a first groove in a portion of the threaded outer surface, the cap  
portion comprising a threaded inner surface being adapted to engage the threaded  
4 outer surface of the fill port and to form a substantially air-tight and water-tight seal  
between the quick fill cap and the fill port, the cap portion having a second groove in  
6 a portion of the threaded inner surface and corresponding to the first groove, wherein  
the first and second grooves define a channel adapted to place the liquid reservoir in  
8 fluid communication with the atmosphere external to the liquid reservoir when the  
first and second grooves are aligned as the cap portion is turned about the fill port.

11. A quick fill cap as defined in claim 7, comprising a hollow funnel  
2 having a lower surface connected to an upper surface of the cap portion such that a  
substantially air-tight and water-tight seal is formed between the lower surface of the  
4 hollow funnel and the upper surface of the cap portion, the hollow funnel being  
substantially aligned with the throughbore of the cap, and wherein the hollow funnel  
6 is disposed external to the liquid reservoir when the cap portion is demountably  
attached to the fill port.

12. A quick fill cap as defined in claim 7, comprising a support member  
2 engaging the valve body of the umbrella valve and applying a force to the valve body  
in the direction to engage the valve body with the cap portion.

13. A quick fill cap as defined in claim 12, comprising a spring biasing the  
2 support member into engagement with the valve body.

14. A toy gun capable of discharging an output stream of liquid, the toy  
2 gun comprising:

a liquid reservoir for storing a quantity of liquid;

4 a fill port for depositing liquid into the liquid reservoir, the fill port having a  
threaded outer surface and a first groove in a portion of the threaded outer surface;

6 a quick fill cap comprising:

a cap portion having a throughbore and a threaded inner surface  
8 engaging the threaded outer surface of the fill port when the cap portion is  
disposed thereon, and forming a substantially air-tight and water-tight seal  
10 between the cap portion and the fill port, and with the cap portion having a  
second groove in a portion of the threaded inner surface and corresponding to  
12 the first groove, wherein the first and second grooves define a channel adapted  
to place the liquid reservoir in fluid communication with the atmosphere  
14 external to the liquid reservoir when the first and second grooves are aligned  
as the cap portion is turned about the fill port, and

16 a one-way valve connected to the cap portion proximate an opening of  
the throughbore, wherein the one-way valve is disposed on the interior of the  
18 liquid reservoir when the cap portion is demountably attached to the fill port,  
the one-way valve being adapted to allow liquid to flow from the exterior of  
20 the liquid reservoir through the channel formed by the throughbore of the cap  
portion and into the reservoir, and to prevent liquid from flowing from the  
22 interior of the liquid reservoir through the channel formed by the throughbore  
of the cap portion to the exterior of the reservoir.

15. A toy gun as defined in claim 14, wherein the one-way valve  
2 comprises a duck bill valve.

16. A toy gun as defined in claim 15, wherein the cap portion comprises a  
2 stem extending downwardly and defining a portion of the throughbore of the cap  
portion, wherein a portion of the duck bill valve is disposed on the outer surface of at  
4 least a portion of the stem with the inner surface of the portion of the duck bill valve  
engaging the outer surface of the at least a portion of the stem, the inner surface of the  
6 portion of the duck bill valve and the outer surface of the at least a portion of the stem  
being adapted to form a substantially air-tight and water-tight seal therebetween,  
8 wherein the support member engages the stem to prevent the duck bill valve from  
collapsing and entering the stem.

17. A toy gun as defined in claim 15, wherein the quick fill cap comprises  
2 a support member disposed within the one-way valve when the one-way valve is  
connected to the cap portion, the support member preventing the one-way valve from  
4 collapsing and entering the throughbore of the cap portion, and allowing liquid to  
flow between the throughbore and the one-way valve.

18. A toy gun as defined in claim 17, wherein the cap portion and the  
2 support member are integrally formed as a single unitary component.

19. A toy gun as defined in claim 14, wherein the one-way valve  
2 comprises an umbrella valve connected to the cap portion and having a valve body  
disposed proximate an opening of the throughbore opposite the hollow funnel,  
4 wherein the one-way valve is disposed on the interior of the liquid reservoir when the  
cap portion is demountably attached to the fill port, the valve body of the umbrella  
6 valve engaging the cap portion to prevent liquid from flowing from the interior of the  
liquid reservoir through the channel formed by the throughbore of the cap portion to  
8 the exterior of the reservoir, and the valve body disengaging the cap portion to allow  
liquid to flow from the exterior of the liquid reservoir through the channel formed by  
10 the throughbore of the cap portion and into the reservoir.

20. A toy gun as defined in claim 19, wherein the cap portion comprises a  
2 stem extending downwardly and defining a portion of the throughbore of the cap  
portion, and a ring having an aperture therethrough with an aperture diameter, the ring  
4 being disposed within the throughbore of the cap portion, and the umbrella valve  
comprises a shaft extending outwardly from the valve body, and a knob having a knob  
6 diameter disposed at the opposite end of the shaft from the valve body, wherein the  
knob diameter is greater than the aperture diameter, and the knob is inserted through  
8 the aperture with the ring engaging the knob to connect the umbrella valve to the cap  
portion.

21. A toy gun as defined in claim 20, wherein the cap portion comprises at  
2 least one rib connecting the ring to an inner surface of the throughbore of the cap  
portion, wherein the at least one rib, ring and inner surface of the throughbore define  
4 at least one opening adapted to allow liquid to flow through the throughbore of the  
cap portion and into the reservoir.

22. A quick fill cap as defined in claim 14, comprising a hollow funnel  
2 having a lower surface connected to an upper surface of the cap portion such that a  
substantially air-tight and water-tight seal is formed between the lower surface of the  
4 hollow funnel and the upper surface of the cap portion, the hollow funnel being  
substantially aligned with the throughbore of the cap, and wherein the hollow funnel  
6 is disposed external to the liquid reservoir when the cap portion is demountably  
attached to the fill port.

23. A quick fill cap for a toy gun capable of discharging an output stream  
2 of liquid, the toy gun having a liquid reservoir for storing a quantity of liquid and a fill  
port for depositing liquid in to the liquid reservoir, the quick fill cap comprising:

4 a cap portion having a throughbore, the cap portion demountably engaging the  
fill port of the toy gun when the cap portion is disposed thereon, and forming a  
6 substantially air-tight and water-tight seal with the fill port;

a valve body slidably connected to the cap portion proximate an opening of  
8 the throughbore and at least partially disposed within the channel formed by the  
throughbore, wherein the valve body is disposed on the interior of the liquid reservoir  
10 when the cap portion is demountably attached to the fill port, the valve body being  
slidable between a closed position wherein the valve body engages the cap portion to  
12 prevent liquid from flowing from the interior of the liquid reservoir through the  
channel formed by the throughbore of the cap portion to the exterior of the reservoir,  
14 and an open position wherein the valve body disengages from the cap portion to allow  
liquid to flow from the exterior of the liquid reservoir through the channel formed by  
16 the throughbore of the cap portion and into the reservoir; and

a biasing member engaging the valve body and the cap portion, and biasing  
18 the valve body toward the closed position.

24. A quick fill cap as defined in claim 23, wherein the valve body  
2 comprises a first flange, a second flange and a shaft connecting the first flange to the  
second flange, the cap portion slidably engaging the shaft to allow the valve body to  
4 move between the open position and the closed position, and the second flange  
engaging the cap portion to prevent liquid from flowing through the channel when the  
6 valve body is in the closed position, and disengaging the cap portion to allow liquid to  
flow through the channel when the valve body is in the open position.

25. A quick fill cap as defined in claim 24, wherein the first flange has at  
2 least one opening, and the first flange is disposed within the channel of the cap  
portion.



26. A quick fill cap as defined in claim 24, wherein the biasing member is  
2 a spring disposed between and engaging the first flange and a portion of the cap  
portion, and the spring biases the first flange toward the closed position.

27. A quick fill cap as defined in claim 23, wherein the throughbore has a  
2 longitudinal axis and the cap portion slidably engages the valve body so that the valve  
body moves parallel to the longitudinal axis from the closed position to the open  
4 position.

28. A quick fill cap as defined in claim 23, comprising a gasket disposed  
2 between the cap portion and the valve body, the gasket engaging the valve body and  
the cap portion to form a substantially air-tight and water-tight seal when the valve  
4 body is in the closed position, and disengaging from one of the valve body and the  
cap portion when the valve body is in the open position.

29. A quick fill cap as defined in claim 23, wherein the portion of the  
2 valve body disposed within the channel formed by the throughbore is accessible from  
the exterior of the cap portion when the cap portion is disposed on the fill port to  
4 engage the valve body to move between the closed position and the open position.

30. A quick fill cap for a toy gun capable of discharging an output stream  
2 of liquid, the toy gun having a liquid reservoir for storing a quantity of liquid and a fill  
port for depositing liquid in to the liquid reservoir, the quick fill cap comprising:

4 a cap portion having a throughbore, the cap portion demountably attaching to  
the fill port of the toy gun when the cap portion is disposed thereon, and forming a  
6 substantially air-tight and water-tight seal with the fill port; and

a one-way valve connected to the cap portion proximate an opening of the  
8 throughbore, wherein the one-way valve is disposed on the interior of the liquid  
reservoir when the cap portion is demountably attached to the fill port, the one-way

10 valve allowing liquid to flow from the exterior of the liquid reservoir through the  
channel formed by the throughbore of the cap portion and into the reservoir, and  
12 preventing liquid from flowing from the interior of the liquid reservoir through the  
channel formed by the throughbore of the cap portion to the exterior of the reservoir.

31. A quick fill cap as defined in claim 30, wherein the one-way valve  
2 comprises a duck bill valve.

32. A quick fill cap as defined in claim 31, wherein the cap portion  
2 comprises a stem extending downwardly and defining a portion of the throughbore of  
the cap portion, wherein a portion of the duck bill valve is disposed on the outer  
4 surface of at least a portion of the stem with the inner surface of the portion of the  
duck bill valve engaging the outer surface of the at least a portion of the stem, the  
6 inner surface of the portion of the duck bill valve and the outer surface of the at least a  
portion of the stem being adapted to form a substantially air-tight and water-tight seal  
8 therebetween.

33. A quick fill cap as defined in claim 30, wherein the one-way valve  
2 comprises an umbrella valve connected to the cap portion and having a valve body  
disposed proximate an opening of the throughbore such that the one-way valve is  
4 disposed on the interior of the liquid reservoir when the cap portion is demountably  
attached to the fill port, the valve body of the umbrella valve engaging the cap portion  
6 to prevent liquid from flowing from the interior of the liquid reservoir through the  
channel formed by the throughbore of the cap portion to the exterior of the reservoir,  
8 and the valve body disengaging to allow liquid to flow from the exterior of the liquid  
reservoir through the channel formed by the throughbore of the cap portion and into  
10 the reservoir.

2           34.     A quick fill cap as defined in claim 33, wherein the one-way valve  
4     comprising a support member engaging the valve body of the umbrella valve and  
   applying a force to the valve body in the direction to engage the valve body with the  
   cap portion.

2           35.     A quick fill cap as defined in claim 34, wherein the one-way valve  
   comprises a spring biasing the support member into engagement with the valve body.

2           36.     A quick fill cap as defined in claim 30, wherein the one-way valve  
4     comprises a valve body slidably connected to the cap portion proximate an opening of  
   the throughbore and at least partially disposed within the channel formed by the  
6     throughbore, wherein the valve body is disposed on the interior of the liquid reservoir  
   when the cap portion is demountably attached to the fill port, the valve body being  
8     slidable between a closed position wherein the valve body engages the cap portion to  
   prevent liquid from flowing from the interior of the liquid reservoir through the  
10    channel formed by the throughbore of the cap portion to the exterior of the reservoir,  
   and an open position wherein the valve body disengages from the cap portion to allow  
12    liquid to flow from the exterior of the liquid reservoir through the channel formed by  
   the throughbore of the cap portion and into the reservoir, and a biasing member  
   engaging the valve body and the cap portion and biasing the valve body toward the  
   closed position.

2           37.     A quick fill cap as defined in claim 36, wherein the valve body  
4     comprises wherein the valve body comprises a first flange, a second flange and a shaft  
   connecting the first flange to the second flange, the cap portion slidably engaging the  
6     shaft to allow the valve body to move between the open position and the closed  
   position, and the second flange engaging the cap portion to prevent liquid from  
8     flowing through the channel when the valve body is in the closed position, and  
   disengaging the cap portion to allow liquid to flow through the channel when the  
   valve body is in the open position.